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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SVEN LINDFORS
and PEKKAJUHA SOININEN

Appeal 2008-4167
Application 10/782,727
Technology Center 2700

Decided:[1] February 18, 2009

Before BRADLEY R. GARRIS, CHARLES F. WARREN, and KAREN M. HASTINGS, *Administrative Patent Judges*.

GARRIS, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 1-43. We have jurisdiction under 35 U.S.C. § 6.

We AFFIRM.

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[1] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the Decided Date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF THE CASE

Appellants claim an apparatus for depositing a thin film on a substrate (claims 1, 26) as well as a showerhead assembly or plate (claims 27, 34) for use in such an apparatus. The apparatus or showerhead structure comprises a plate having pluralities of apertures for passing gas therethrough. At least some of these apertures may be connected with gas passages or pathways which have been machined into the plate.

Representative independent claims 1, 26, 27, and 34 are set forth below as reproductions taken from the Claims Appendix of the Appeal Brief.

1. An apparatus for depositing a thin film on a substrate comprising:

a reaction chamber having a reaction space;

a substrate holder for holding the substrate within the reaction space;

a gas outlet in fluid communication with the reaction space;

a gas exchange plate having a first side and a second side, positioned within the reaction chamber, the plate comprising:

a plurality of first passages machined therein being in fluid communication with a first reactant gas source and a purge gas source, the first passages communicating with a plurality of first apertures spaced along the first passages, the first apertures opening to the reaction space;

a plurality of second passages machined therein being in fluid communication with a second reactant gas source and a purge gas source, the second passages communicating with a plurality of second apertures spaced along the second passages, the second apertures opening to the reaction space; and

a plurality of third apertures extending from the first side to the second side of the gas exchange plate, allowing gas to pass therethrough.

26. An apparatus for depositing a thin film on a substrate comprising:

a reaction chamber having a reaction space,

a substrate support, disposed within the reaction space;

a first plate positioned above the substrate support, the first plate having:

a first gas inlet fluidly connected to a first plurality of apertures via a first gas pathway;

a second gas inlet fluidly connected to a second plurality of apertures via a second gas pathway, wherein the first and second pathways are machined into the first plate;

a third plurality of apertures allowing gas to pass through the first plate; and

a second plate fixed to a gas outlet, positioned above the first plate, having a plurality of apertures allowing gas existing between the first plate and the second plate to flow to the gas outlet.

27. A showerhead assembly for a vapor deposition chamber, comprising:

a gas exchange plate having a thickness between a first side and a second side, the gas exchange plate defining a first network of passages in fluid communication with a first gas inlet and a second network of passages in fluid communication with a second gas inlet, the first and second network of passages including a plurality of first and second apertures opening from the first and second network of passages, respectively, to the second side of the gas exchange plate, the first and second apertures being interspersed and spaced across the second side of the gas exchange plate, the gas exchange plate further including a plurality of third apertures extending from the first

side to the second side through the thickness of the gas exchanger plate and being isolated from the first and second network of passages; and

an exhaust plate having a plurality of exhaust apertures therein, the exhaust plate configured to mate with the exchange plate and align the exhaust apertures with the third apertures of the exhaust plate.

34. A showerhead plate having a first side and a second side, comprising:

a first flow path through the showerhead plate, the first flow path including a plurality of first apertures opening to the second side of the showerhead plate;

a second flow path through the showerhead plate, the second flow path isolated from the first flow path within the plate, the second flow path including a plurality of second apertures opening to the second side of the showerhead plate; and

a plurality of third apertures extending through the showerhead plate, the third apertures isolated from the first and second flow paths within the showerhead plate.

The following evidence is relied upon by the Examiner to show unpatentability:

Oda	US 5,010,842	Apr. 30, 1991
Kobayashi	US 5,370,709	Dec. 6, 199
Heming	US 6,025,013	Feb. 15, 2000
Olgado	US 6,736,408 B2	May 18, 2004

Claims 1-43 of Appellants' copending application 10/428,207.

All appealed claims are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-43 of Appellants' co-pending '207 application.

Claims 1-9, 11, 13, 16, 18, 20, 21, 30-32[2], 34-36, and 39-42 are rejected under 35 U.S.C. § 102(b) as being anticipated by Heming.

Under 35 U.S.C. § 103(a): claims 10, 12, 22-29, 33, 37, 38, and 43 are rejected as being unpatentable over Heming in view of Oda; claims 14 and 15 are rejected as being unpatentable over Heming in view of Kobayshi; and claims 17 and 19 are rejected as being unpatentable over Heming in view of Olgado.

THE OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTION

We summarily sustain this rejection since it has not been contested by Appellants in the record of this appeal (Br. 20).

THE § 102 REJECTION

ISSUES

Have Appellants shown error in the Examiner's finding that Heming's Figure 1 apparatus includes a plate comprising a plurality of first and second passages machined therein and respectively communicating with a plurality of first and second apertures spaced along the passages as required by independent claim 1?

Have Appellants shown error in the Examiner's finding that Heming's Figure 1 apparatus includes a showerhead plate comprising a plurality of flow paths including apertures as required by independent claim 34?

[2] Although claims 30-32 are included in the § 102 rejection, the parent claims from which they depend are not included in this rejection. The resulting inconsistency appears to be due to an inadvertent error on the Examiner's part. This error is harmless in light of our disposition of the subject appeal.

FINDINGS OF FACT

As support for the § 102 rejection, the Examiner relies on Heming's disclosure at Figure 1 and at lines 10-30 of column 11 (Ans. 4-13).

The Figure 1 apparatus of Heming comprises a head plate 12 having a gas permeable surface 11 in fluid communication with gas section nozzle 10 which includes four sections 13, 14, 15, and 16 (Fig. 1; col. 11, ll. 10-30). Sections 13, 14, and 15 serve to feed make-up gases via feeds lines 21, 21a, and 22 while section 16 serves to siphon off residual gases (*id.*). The gas permeable surface 11 is advantageously provided with holes for the passage of gas (col. 9, ll. 7-9). The gas section nozzle 10 is made of concentric cylinders (Figs. 1, 7a; col. 9, ll. 24-26).

PRINCIPLES OF LAW

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 827 (1987).

ANALYSIS

As correctly argued by Appellants (Br. 15), the Figure 1 apparatus of Heming does not include a plate comprising a plurality of passages machined therein which communicate with a plurality of apertures spaced along the passages as required by claim 1. The only plate disclosed by Heming for the Figure 1 apparatus is head plate 12, and plate 12 does not include a plurality of passages machined therein with a plurality of apertures spaced along the passages.

According to the Examiner, elements 11-15 in Figure 1 constitute the claim 1 gas exchange plate and, "bifurcated" elements 21, 22 constitute the

claim 1 first and second passages (Ans. 5). However, contrary to these findings by the Examiner, Heming's Figure 1 sections 13-15 do not constitute a plate but instead constitute the upper portions of the concentric cylinders which make up the gas section nozzle 10. Also, the portions of these concentric cylinders which include feed lines 21, 22 are not "bifurcated" to thereby form a plurality of passages as characterized by the Examiner. Rather, these concentric cylinders define a single annular passage at 21 and 22 respectively.

For these reasons, Figure 1 of Heming does not disclose each and every element set forth in claim 1.

We reach a different determination with respect to claim 34. This claim requires first and second flow paths through a showerhead plate which are isolated from one another and which include first and second apertures. This requirement is satisfied by Heming's above discussed disclosure of plate 12 with holes therethrough. Specifically, Heming's plate holes at section 13 read on the claim 34 first flow path, and patentee's plate holes at section 14 read on the claim 34 second flow path. Further, these plate holes at sections 13 and 14 are isolated from one another since they respectively communicate only with the passages defined by these sections. Finally, the claim 34 requirement for a plurality of third apertures is satisfied by Heming's plate apertures at sections 15 and/or 16.

In contesting the anticipation rejection of claim 34, Appellants merely reiterate the claim limitations (Br., ¶ bridging 15-16) and state only that the gas nozzle structure of Heming "does not meet the claim limitations of this claim" (Br. 16, first full para.). However, the reiteration of claim limitations does not constitute an argument with the meaning of 37 C.F.R. §

41.37(c)(1)(vii). Moreover, the above-quoted statement does not identify with reasonable specificity any error in the Examiner's anticipation finding with respect to independent claim 34 or the rejected claims which depend therefrom (Br. 16, second full para.).

CONCLUSIONS OF LAW

Appellants have shown error in the Examiner's finding that the Figure 1 apparatus of Heming includes a gas exchange plate comprising a plurality of first and second passages machined therein having respectively a plurality of first and second apertures spaced along the passages as required by claim 1.

Therefore, we cannot sustain the § 102 rejection based on Heming of independent claim 1 or of claims 2-9, 11, 13, 16, 18, 20, and 21 which ultimately depend therefrom. We also cannot sustain the § 102 rejection of claims 30-32 which ultimately depend from separately-rejected independent claim 27 because the § 103 rejection of this independent claim is not sustainable for reasons discussed below.

Appellants have not shown error in the Examiner's finding that Heming's Figure 1 apparatus includes a plate having the flow paths and apertures required by independent claim 34.

As a consequence, we sustain the § 102 rejection based on Heming of independent claim 34 and of non-argued claims 35, 36, and 39-42 which depend therefrom.

THE § 103 REJECTIONS

ISSUES

Have Appellants shown error in the Examiner's unpatentability determinations for the rejected claims which depend from independent claim1 and for rejected independent claims 26 and 27?

Have Appellants shown error in the Examiner's unpatentability determinations for the rejected claims which depend from independent claim 34?

FINDINGS OF FACT

The findings for Heming have been discussed above.

Oda discloses an apparatus for forming a thin film on a substrate which comprises a uniforming means 30 disposed above the substrate (Fig. 4) which may be in the form of a diffusing means having a plurality of pipes (Fig. 9).

Findings for the remaining references to Kobayashi and Olgado are unnecessary for resolution of the issues presented in this appeal.

PRINCIPLES OF LAW

Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational unpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), *cited with approval in KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007).

ANALYSIS

As correctly argued by Appellants, Oda does not cure the previously discussed deficiencies of Heming (Br. 17-18), and the Examiner does not contend otherwise. Therefore, the combination of Heming and Oda would

not have suggested the above-discussed plate limitations of independent claim 1 which are required by the here-rejected claims that depend from claim 1 or the corresponding plate limitations of independent claim 26 (e.g., "wherein the first and second pathways are machined into the first plate").

Appellants also correctly argue that the combination of Heming and Oda would not have suggested the second plate limitations of independent claim 26 (Br. 18) or the independent claim 27 requirement that the first and second apertures of the first and second network of passages must be interspersed and spaced across the second side of the gas exchange plate (Br. 18-19).

According to the Examiner "[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to add Oda's top plate and add additional holes/apertures to Heming's showerhead assembly" motivated by a desire "for gas 'uniformizing' as taught by Oda (col. 3, ll. 13; col. 1 [,] ll. 65-68)" (Ans. 19). However, this obviousness conclusion lacks articulated reasoning with some rational underpinning which explains why a desire for gas uniformizing would have motivated combining Heming and Oda in such a manner as to yield the subject matter defined by independent claims 26 and 27.

In particular, the Examiner has not adequately and rationally explained why and how Heming and Oda would have been combined so as to obtain the machined pathways and second plate limitations of claim 26 or the claim 27 requirement for first and second apertures of first and second networks of passages which are interspersed and spaced across the plate.

Concerning this claim 27 requirement, the Examiner finds that the holes in Heming's plate 12 are interspersed and spaced thereby satisfying the

requirement under consideration (Ans. 28). However, this claim 27 requirement is illustrated in Appellants' Figure 5 by first and second apertures 152, 156 in first and second networks of passages 150, 154 wherein first apertures 152 in the first network of passages 150 are interspersed among second apertures 156 in the second network of passages 154. Furthermore, this Figure 5 disclosure is correspondingly described in Appellants' Specification (¶¶ [0048]-[0054]). The Examiner has provided no explanation at all as to why it would be reasonable and consistent with Appellants' disclosure to interpret the claim 27 requirement "the first and second apertures being interspersed" in such a manner as to be satisfied by the holes in Heming's plate 12.

Finally, we observe that Appellants have not separately argued the here-rejected claims which depend from above-discussed independent claim 34 (Br. 19, 4th full para.).

CONCLUSIONS OF LAW

For the reasons set forth above, Appellants have shown error in the Examiner's unpatentability determinations for the rejected claims which depend from independent claim 1 and for rejected independent claims 26 and 27.

Under these circumstances, we cannot sustain the § 103 rejections of claims 10, 12, 22-29, and 33 as being unpatentable over Heming in view of Oda or of claims 14 and 15 as being unpatentable over Heming in view of Kobayshi or of claims 17 and 19 as being unpatentable over Heming in view of Olgado.

Appellants have presented no separate argument and therefor have shown no error for the § 103 rejection of claims 37, 38, and 43 which ultimately depend from independent claim 34.

We sustain, therefore, the rejection of claims 37, 38, and 43 as being unpatentable over Heming in view of Oda.

SUNMMARY

We have sustained the provisional obviousness-type double patenting rejection of claims 1-43, the § 102 rejection of claims 34-36 and 39-42, and the § 103 rejection of claims 37, 38, and 43.

We have not sustained any of the other rejections advanced by the Examiner in this appeal.

ORDER

The decision of the Examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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